



**NUMERACY**  
**Using number: Calculation**  
**SCQF Level 3**  
**20 Hour Unit**

# **CORE SKILLS UNIT**

## **ASSESSMENT SUPPORT PACK**

### **Part 1: Information for tutors**

#### **What is involved?**

This Unit is one of a group of three:

- ◆ Using number: calculation [20 hour Unit]
- ◆ Using number: measuring [10 hour Unit]
- ◆ Using graphical information [10 hour Unit]

Together these deliver the complete Numeracy Core Skill at SCQF level 3.

Using number: calculation is about applying simple numerical skills in everyday personal, workplace, social and educational situations which involve calculations. The focus of the Unit is on transferable numeracy skills. It is designed for delivery in schools, colleges, workplaces, community and other learning environments.

Everyday situations might involve money, time, length, weight, area, volume or temperature.

The learner will be expected to work with familiar tasks which involve only a small number of obvious steps.

Learner motivation can be maximised by making the numeracy activities as relevant as possible to the learner's likely uses for numeracy. The activities should consist of an appropriate mix from: personal, workplace, social and educational examples. Additionally, integration of the numeracy activities with those of other SQA Units being undertaken should be explored. For example, when a learner is undertaking vocational Units, motivation for numeracy can be increased if the activities are related to the vocational Unit and the learner can see the direct relevance of the numeracy.

## Assessment and evidence

Learners at SCQF level 3 will need support and may carry out their calculations mentally or in writing. The numeracy activities they carry out may require exact or approximate answers. You should show the learners how to check their answers and encourage them to do it routinely. However, for achievement of the Unit, evidence of this checking is not required.

The numerical activities should be familiar to the learner and only involve a small number of steps.

The learners:

- ◆ may carry out the calculations mentally, in writing, using a calculator or another electronic device eg a computer
- ◆ must give correct answers
- ◆ should check their answers, although evidence of this checking is not required

You should try to identify naturally-occurring opportunities for assessment when possible. For learners who are also working towards vocational Units, opportunities for assessment of number skills could arise while completing vocational tasks which provide evidence for both the vocational Unit and this Unit. Some of the exemplars in this pack could be used or contextualised for this purpose.

The assessment process is likely to involve one or more of:

- ◆ written tasks
- ◆ oral questioning
- ◆ observation

When assessing by observation, you must keep a detailed checklist. Similarly if you use oral questioning, you must keep a record of both the questions and learner responses. All evidence, whether produced by the learner or a record made by yourself must be retained, signed and dated by you.

## Planning

You should work out where opportunities for meeting the standards are likely to arise. Where possible this should be built into the assessment process. You should discuss this assessment process with the learners so that they are quite clear about what is expected from them.

## Guidance on the Unit

### What learners need to know or be able to do

The Unit states that on completion the learner will know how to:

- ◆ use notation for each of the following — whole numbers (eg 5), simple decimals (eg 2.45), simple percentages (eg 30%), simple fractions (eg  $\frac{2}{3}$ ), simple ratios (eg 1:3, 5:1)
- ◆ carry out all of the following — addition, subtraction, multiplication, division
- ◆ carry out simple calculations involving either whole number percentages (eg 30%) OR simple fractions (eg  $\frac{2}{5}$ )
- ◆ decide which calculations need to be carried out and in what order (eg add, then multiply)
- ◆ draw conclusions from the results of their calculation.

### Notation

Learners should be able to read and understand the notation for:

- ◆ whole numbers
- ◆ simple decimals
- ◆ simple percentages
- ◆ simple fractions
- ◆ simple ratios

They should be able to convert between values written in words and numerical notation such as:

- ◆ four fifths =  $\frac{4}{5}$
- ◆ five percent = 5%
- ◆ a ratio of one to three = 1:3

Decimals should be to no more than two places eg 1.25, percentages should be whole numbers.

Very large and very small numbers are not dealt with in this Unit. This can be taken care of if you choose the correct units for the learners' activities. For example the value 2,500,000 watts could be expressed as 2.5 megawatts. Similarly £1,500,000 may be expressed as 1.5 million pounds.

## Basic operations

The learners should be familiar with the four basic arithmetic operations of addition, subtraction, multiplication and division using whole numbers.

Calculations such as:

$$23 + 45 =$$

$$91 - 22 =$$

$$12 \times 15 =$$

$$78 \div 15 =$$

The answers for division may not be whole numbers but the calculation should not lead to an answer of more than two decimal places.

## Combining operations

The basic operations can be combined to allow the learners to tackle more complex calculations. When two or three operations have to be carried out, the learners should decide which operations are required and then think out the order of the operations.

The activity could be the straightforward combination of two operations, such as: A group of friends consists of six men and five women. They go out for a meal together at an 'eat all you want for £5' restaurant. What is the total bill for the meals?

The addition of the six men and five women is followed by the multiplication by five pounds to get the answer.

A combined activity can involve a fraction, such as: The price of a DVD usually costing £8 has been reduced by two fifths in a sale. What is the saving?

For the learner the two fifths contains an initial division followed by a subsequent multiplication of the original cost. The two steps of the calculation could also be done in reverse order.

## Application to problems

Although you may feel that it is necessary to deliver some of the fundamental parts of the material for this numeracy Unit abstractly, it is vital to make all the learning materials as relevant to the learners as possible. Only by making the activities address a particular part of the learners' everyday personal, workplace, social or educational situation, can you maximise motivation.

You are encouraged to relate even the simplest calculation to the learners' experiences so the result that they will produce is not an abstract number but the solution to a relevant problem. Therefore, the learners are drawing a conclusion at the end of the activity.

In some contexts you may need to provide and explain simple formulae to the learners to allow them to complete the activity. If so, you should give the formula in words and it is not necessary to use algebraic notation.

An example is: You can work out the *floor area of a rectangular room by multiplying the length of the room by its width.*

Other than specific workplace activities, the areas of time and money yield countless opportunities for activities. These should be familiar concepts to your learners and basing some of the numeracy activities on these two areas may be of particular help in the personal development of some learners.

## Gathering evidence

It may be appropriate for you to gather written evidence produced by the learner carrying out practical exercises. However, written evidence is not essential for this Unit and is inappropriate if it disadvantages the learner.

You may wish instead to observe the learner carrying out a task and question them on completion. This requires you to create and complete record sheets comprising a checklist, questions asked and learner responses.

From the learner's point of view, it is very useful to be provided with a means of keeping all the work relevant to this Unit together. You can help here by creating and providing the learner with a workbook which includes all the evidence gathering items. An alternative is to provide worksheets which can be made into a portfolio or e-portfolio.

If you have chosen to integrate the numeracy work with that of other Units being undertaken by the learner, it may be possible to assess the numeracy as part of a larger single activity. In this case you must keep separate records of assessment decisions for this Unit.

Evidence for this Unit may be gathered in a variety of ways. Some typical activities might be:

- ◆ calculating the number of extra staff required for a 20% increase in staffing if a firm employs 200 people
- ◆ deciding how many adults are required to take a group of 20 six-year old children on an outing, if current guidance recommends a child: adult ratio of 5:1
- ◆ deciding the appropriate time to leave the house for work, based on the expected journey time of 35 minutes and a required arrival time of 8.30am
- ◆ working out the cost of  $\frac{3}{4}$  of a kilo of potatoes, when the price per kilo is £1.60.

It is possible to create a single activity which would provide the evidence for the whole Unit. However this may not be appropriate for your learners and a more gradual approach might be helpful. An approach you might use is to have one activity covering numerical notation and simple numerical calculation. This will also cover the four arithmetic operations.

A second activity can be used to gather evidence for multiple operations and drawing conclusions from results. The second activity would show a more problem-solving nature and would involve the learner deciding on the order of the operations

## Part 2: Exemplar assessment tasks

### Note

You can use the exemplar assessments given in this section in several ways:

- ◆ to help identify the type and amount of evidence which the learner needs to produce
- ◆ to help identify the level of complexity in evidence required for this Core Skill at this level
- ◆ to help you to create an assessment task related to the learner's own situation
- ◆ as an off-the-shelf assessment, although every effort should be made to source/provide the learner(s) with their own meaningful context.

## Exemplar assessment

### Task 1: Work with basic numerical notation and carry out numerical calculations.

- 1 Each year, the amount of sunshine days that a summer holiday destination has is two hundred and fifty. Write that down as a number in the box provided.
- 2 The proportion of people in a questionnaire who say they enjoy New Year celebrations was fifty five percent. Write that down as a numerical expression in the box provided.
- 3 The ratio of soft centred to hard centred sweets in a chocolate box is one to four. Write that down as a numerical expression in the box provided.
- 4 The fraction of food left over after a party is one quarter. Write that down as a numerical expression in the box provided.
- 5 A length of a wooden beam in metres is six point nine. Write that down as a number in the box provided.
- 6 Sam records a television programme of 17 minutes and then one of 39 minutes on one DVD. What is the total recording time?

- 7 Wendy gets paid £260 for her work but has to give up £50 of that in tax. How much is she left with?
- 8 Alex runs 50 kilometres per week for fitness training. If he does this for 20 weeks, how far has he run in total?
- 9 Sandy has to run 450 kilometres over 9 weeks, for his fitness training. How far must he run each week?
- 10 A shopper spends £100 and gets a discount of £15 back. What is the percentage saving?
- 11 Jim wins a prize of £300. He decides to give one quarter of it to his friend Ted. How much does Ted get?

**Task 2: Decide which calculations need to be carried out and in what order and draw conclusions from the results produced.**

- 1** Rob attends the gym and has to exercise for 40 minutes. After a while he looks at the clock and realises that he is only one quarter of the way through his routine. How many minutes has he still to go?
- 2** Jan power-walks for a total of six hours each week. One week she has walked for 1 hour and 15 minutes on Monday and 1 hour and 45 minutes on Wednesday. She will be free to walk only on Friday and Sunday for the rest of the week. How long must she walk on Friday and Sunday if she does the same time on each of these days?
- 3** A soap dispenser holds 1500ml of liquid soap. Each press of the dispenser uses 5ml of soap. On average it is pressed 50 times each day. How many days will a full dispenser last?
- 4** A large bottle of ketchup normally costs 60 pence. A special offer bottle contains 25% extra and costs 70 pence. Is the special offer bottle really a bargain?
- 5** To find a person's body mass index (BMI) you need their height in metres and their weight in kilograms.

The formula for BMI is: multiply the height by itself and divide the result into the person's weight.

Calculate the BMI of Don who has a height of 2.0 metres and weighs 80 kilograms.

## Notes for assessment

The learner must successfully complete both tasks to achieve the Unit.

The worked out questions here are not presented as model answers but have the purpose of illustrating the way in which the questions satisfy the requirements of the Unit.

### Task 1

This task covers working with basic numerical notation and carrying out simple addition, subtraction, multiplication and division. The learners must successfully complete all of the questions to achieve the task.

- 1 250 — whole number notation.
- 2 55% — simple percentage notation.
- 3 1:4 — simple ratio notation
- 4  $\frac{1}{4}$  — simple fraction notation
- 5 6.9 — simple decimal notation
- 6  $17 + 39 = 56$  minutes — addition
- 7  $£260 - £50 = £210$  — subtraction
- 8  $50 \times 20 = 1000$  kilometres — multiplication
- 9  $450 \div 9 = 50$  kilometres — division
- 10  $100 \times 15 \div 100 = 15\%$  — calculation of simple percentage
- 11  $1 \times £300 \div 4 = £75$  — use of simple fraction

## Task 2

This task comprises five questions. These decide which calculations need to be carried out and in what order and draw conclusions from the results produced. To show consistent ability, learners should successfully complete any four of them to achieve the task.

There is unavoidable overlap with much of task 1. If task 2 were extended to include the notation aspects of the Unit, then it would cover the whole Unit and task 1 would not be required.

Question two involves manipulating hours and minutes. It is only applicable if the time concepts have been explicitly covered in the learning material.

Although all these questions require the learner to draw a simple conclusion, question four demands an explicit example of this in the form of a decision.

- 1 This involves division and subtraction in that order. It uses a simple fraction.

$$1 \times 40 \div 4 = 10$$
$$40 - 10 = 30 \text{ minutes.}$$

- 2 This involves addition, subtraction and division in that order.

$$1\text{h } 15\text{m} + 1\text{h } 45\text{m} = 3\text{h } 0\text{m}$$
$$6\text{h} - 3\text{h } 0\text{m} = 3\text{h } 0\text{m}$$
$$3\text{h } 0\text{m} \div 2 = 1\text{h } 30\text{m} = \text{one hour and thirty minutes on each day.}$$

- 3 This involves multiplication and division in that order.

$$\text{one day's soap is } 50 \times 5\text{ml} = 250\text{ml}$$
$$1500 \div 250 = 6 \text{ days.}$$

- 4 This involves multiplication, division addition and implied subtraction in that order. It uses a simple percentage. A conclusion is drawn at the end.

$$\text{cost of 25\% of normal bottle} = 25 \times 60 \div 100 = 15 \text{ pence}$$
$$\text{cost of special bottle at normal price} = 60 + 15 = 75 \text{ pence}$$

75p is 5p dearer than 70p for special offer  
The special offer is a bargain.

- 5 This involves the solution of a problem expressed as a formula in words. The calculation is multiplication followed by division.

$$\text{multiply the height by itself } 2 \times 2 = 4$$
$$\text{divide } 80 \div 4 = 20$$
$$\text{BMI} = 20$$

### Part 3: Exemplar recording documentation

This section provides example forms which can be used by the learner and tutor to gather evidence and record assessment decisions. The first form, the record sheet, is an example of a form for the learner to complete when being assessed for task 2. Alternatively, it can be completed by the tutor to record oral responses. For task 1, a separate record is not required as the exemplar sheet itself is to be completed by the learner.

The two checklists are for completion by the tutor, recording assessment and Unit progress. In the first checklist, under the heading 'Activity' the tutor should insert the component of the skill eg simple fraction, notation or addition, subtraction and division.

## Record sheet

**Task 2: Decide which calculations need to be carried out and in what order and draw conclusions from the results produced.**

- 1 Rob attends the gym and has to exercise for 40 minutes. After a while he looks at the clock and realises that he is only one quarter of the way through his routine. How many minutes has he still to go?

Answer:

- 2 Jan power-walks for a total of six hours each week. One week she has walked for 1 hour and 15 minutes on Monday and 1 hour and 45 minutes on Wednesday. She will be free to walk only on Friday and Sunday for the rest of the week. How long must she walk on Friday and Sunday if she does the same time on each of these days.

Answer:

- 3 A soap dispenser holds 1500ml of liquid soap. Each press of the dispenser uses 5ml of soap. On average it is pressed 50 times each day. How many days will a full dispenser last?

Answer:

- 4 A large bottle of ketchup normally costs 60 pence. A special offer bottle contains 25% extra and costs 70 pence. Is the special offer bottle really a bargain?

Answer:

- 5 To find a person's body mass index (BMI) you need their height in metres and their weight in kilograms.

The formula for BMI is: multiply the height by itself and divide the result into the person's weight.

Calculate the BMI of Don who has a height of 2.0 metres and weighs 80 kilograms.

Answer:

Tutor comments:

Tutor signature:..... Date:.....

## Assessment checklist

<b>Candidate:</b>		
<b>Task 1:</b> Work with basic numerical notation and carry out numerical calculations.		
Activity	Evidence	Tutor comment / Date
1		
2		
3		
4		
5		
6		
7		
8		
9		
10		
11		
<b>Task 2:</b> Decide which calculations need to be carried out and in what order and draw conclusions from the results produced.		
Activity	Evidence	Tutor comment / Date
1		
2		
3		
4		
5		
Tutor signature:		Date:

## Summary checklist

<b>Candidate:</b>		
<b>Candidate number:</b>		
<b>Centre:</b>		
<b>Task</b>	<b>Date achieved</b>	<b>Tutor signature</b>
<b>Task 1:</b> Work with basic numerical notation and carry out numerical calculations.		
<b>Task 2:</b> Decide which calculations need to be carried out and in what order and draw conclusions from the results produced.		

## Part 4: Information for learners

As you work through this Unit, your tutor will need to gather evidence that you are successfully completing the various tasks you do.

This can be done:

- ◆ by you completing an exercise
- ◆ by the tutor watching you work
- ◆ by the tutor asking you questions
- ◆ by you filling in a work book or diary

By the end of the Unit you must have shown that you can:

- ◆ use notation for each of the following — whole numbers (eg 5), simple decimals (eg 2.45), simple percentages (eg 30%), simple fractions (eg  $\frac{2}{3}$ ), simple ratios (eg 1:3, 5:1)
- ◆ carry out all of the following — addition, subtraction, multiplication, division
- ◆ carry out simple calculations involving either whole number percentages (eg 30%) OR simple fractions (eg  $\frac{2}{5}$ )
- ◆ decide which calculations need to be carried out and in what order (eg add, then multiply)
- ◆ draw conclusions from the results of your calculation

These are some of the things you might do to provide the evidence:

- ◆ calculating the number of extra staff required for a 20% increase in staffing if a firm employs 200 people
- ◆ deciding how many adults are required to take a group of 20 children on an outing, if current guidance recommends a child: adult ratio of 5:1
- ◆ deciding the appropriate time to leave the house for work, based on the expected journey time of 35 minutes and a required arrival time of 8.30am
- ◆ working out the cost of  $\frac{3}{4}$  of a kilo of potatoes, when the price per kilo is £1.60

## Learners with disabilities and/or additional support needs

The additional support needs of individual learners should be taken into account when planning learning experiences, selecting the most appropriate assessment activity and considering any reasonable steps which might be necessary to allow the learner to meet the assessment standard.

Further advice can be found in SQA's Assessment Arrangements' web pages ([www.sqa.org.uk](http://www.sqa.org.uk))

## ADMINISTRATIVE INFORMATION

### Core Skills

This Unit is part of a suite of three Units which when completed give automatic certification of the Core Skill of Numeracy at SCQF Level 3. The other Units in this suite are:

Using number: Measuring at SCQF Level 3

Using Graphical Information at SCQF Level 3

### Credit Value

1 Credit(s) at (SQA Level 09) (6 SCQF credit points at SCQF Level 3)

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